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Impact of Treadmill Exercise on Efficacy Expectations, Physical Activity, and Stroke Recovery

Marianne Shaughnessy, PhD, CRNP^{1,2}, Kathleen Michael, PhD², and Barbara Resnick, PhD, CRNP, FAAN, FAANP²

¹Department of Veterans Affairs and Veterans Affairs Medical Center Baltimore Geriatric Research, Education and Clinical Center (GRECC)

²University of Maryland Baltimore School of Nursing

Abstract

Stroke survivors are at high risk for cardiovascular mortality which can be in part mitigated by increasing physical activity. Self-efficacy for exercise is known to play a role in adoption of exercise behaviors. This study examines self-reported psychological outcomes in a group of 64 stroke survivors randomized to either a 6-month treadmill training program or a stretching program. Results indicated that regardless of group, all study participants experienced increased self efficacy ($F=2.95$, $p=0.09$) and outcome expectations for exercise ($F=13.23$, $p<0.001$), and improvements in activities of daily living as reported on the Stroke Impact Scale ($F=10.97$, $p=0.002$). No statistically significant between-group differences were noted, possibly due to the fact that specific interventions designed to enhance efficacy beliefs were not part of the study.

Theoretically based interventions should be tested to clarify the role of motivation and potential influence on exercise and physical activity in the post-stroke population.

Keywords

Self-efficacy; stroke; exercise; activity; function

Stroke is a significant cause of neurological disability in the United States (Roger et al., 2011), and a major health concern in the older adult population. Stroke survivors remain at high risk for recurrent stroke and cardiovascular morbidity, the leading cause of death in this group (Roger, et al., 2011). Regular physical activity and exercise may reduce risk by promoting cardiovascular health and countering the cycle of learned non-use. However, most stroke survivors, like older adults as a whole, are not routinely encouraged to exercise, and often lack means, specific direction and motivation to exercise in their daily lives. The American Stroke Association (Gordon et al., 2004) published exercise guidelines for stroke survivors recommending 20-60 minutes of aerobic exercise three to seven days per week, with additional recommendations for adding resistance training, balance and stretching exercises. However, the real-life implementation of these recommendations is unclear, and the guidelines provide no specific directions for individuals with varying deficit and risk profiles (Gordon, et al., 2004).

Self-efficacy and outcome expectations are known predictors of exercise behavior among older individuals, including those who have sustained strokes (King, Baumann, O'Sullivan, Wilcox, & Castro, 2002; Shaughnessy, Resnick, & Macko, 2006). Bandura (1977) differentiates self-efficacy expectations, which are beliefs in the individual's capability to perform a course of action to attain a desired outcome, from outcome expectations, which are the beliefs that a certain consequence will be produced by personal action. Social Cognitive Theory informs us that one's self-efficacy and outcome expectation affects

behavior, motivational level, thought patterns and emotional reactions to any situation. The stronger an individuals' self-efficacy and outcome expectations are, the more likely it is that the individual will initiate and persist with a given activity. Efficacy expectations are dynamic and are both appraised and enhanced by four mechanisms (Bandura, 1997): (1) enactive mastery experience, or successful performance of the activity of interest; (2) verbal persuasion, or encouragement, given by a credible source that the individual is capable of performing the activity of interest; (3) vicarious experience or seeing like individuals perform a specific activity; and (4) physiological and affective states such as pain, fatigue, anxiety, hunger, or dizziness associated with a given activity. These beliefs are essential to the adoption and maintenance of self-care ADL after stroke (Robinson-Smith, 2003).

Regular exercise improves cardiovascular fitness, motor strength, ambulation and overall function in stroke survivors (Ivey, Ryan, Hafer-Macko, Goldberg, & Macko, 2007; Macko, Ivey, & Forrester, 2005; Macko et al., 2001; Silver, Macko, Forrester, Goldberg, & Smith, 2000; Smith, Silver, Goldberg, & Macko, 1999). While testing and training strategies have varied, the consistent finding is that individuals with stroke have markedly impaired aerobic capacity, as reflected in reduced VO_2 peak levels that are approximately half that of age-matched sedentary controls (Ivey, Hafer-Macko, & Macko, 2006; Ivey, Macko, Ryan, & Hafer-Macko, 2005; Mol & Baker, 1991). Individuals with stroke have 1.5 to 2-fold elevated energy requirements for hemiparetic gait (Macko et al., 1997). The combination of poor peak exercise capacity and elevated ambulatory energy demand is termed "diminished physiologic fitness reserve" (McArdle, 1996), and compromises stroke survivors' capacity to sustain basic mobility activities of daily living (Macko, et al., 2001). Over the last decade, major advances have been made in our understanding of the effectiveness of exercise and lifestyle interventions to improve cardio-metabolic health after stroke. However, there remains a need for individuals with stroke to adopt health- and function-promoting activity and exercise behaviors in their daily lives.

The purpose of this study was to determine whether task-oriented treadmill training would influence self-efficacy and outcome expectations over time, and whether it would affect performance of community-based physical activity. We hypothesized that participants exposed to treadmill training would: (1) have stronger efficacy expectations (self-efficacy and outcome expectations); (2) engage in more community-based physical activity (housework, exercise, recreational activity, and total activity); and (3) report improvements in their physical status, memory, mood, communication, daily activities, mobility, hand function, social activities, and overall recovery post stroke than an control group exposed to stretching exercises only for a matched period of exposure.

Methods

Our randomized controlled trial has been described previously as have findings related to physiological outcomes (Luft et al., 2008; Macko, et al., 2005; Ryan et al., 2009; Wheaton, Villagra, Hanley, Macko, & Forrester, 2009). In brief, men and women (older than 45 years of age) with chronic ischemic stroke and hemiparetic gait deficits who had completed all conventional rehabilitation were screened for eligibility. Baseline evaluations included a medical history and physical examination, ECG, blood chemistries and hematologic examination, Folstein Mini-Mental State examination (MMSE), and Center for Epidemiological Studies Depression Scale (CES-D). Participants with heart failure, unstable angina, peripheral arterial occlusive disease, dementia (MMSE ≤ 23 for those with 9th grade education or more and ≤ 17 for those with 8th grade education or less), significant aphasia (unable to follow 2-point commands), untreated major depression (CES-D ≥ 16), and other medical conditions precluding participation in aerobic exercise were excluded. Gait-safety and cardiopulmonary response to strenuous physical exertion were assessed during a

screening treadmill exercise test. Subjects achieving adequate exercise intensities (walking for at least 3 minutes at a minimum of 0.09 m/s) without signs of myocardial ischemia or treadmill exercise intolerance were enrolled. Subjects then underwent baseline measurements, and were randomized to either a six-month treadmill exercise intervention, or an attention-matched control group doing standardized stretching. All participants provided written informed consent. The study was approved by institutional review boards at the University of Maryland and Baltimore Veterans Administration Medical Center.

Sample

A total of 162 volunteers were screened with 17 excluded due to medical conditions, 6 excluded for functional impairment, 2 excluded as they were still engaged in sub-acute therapy, and 24 excluded due to inability to get to the exercise training facility (e.g., family responsibilities, distant location). A total of 113 individuals were enrolled in the trial (70% of screened volunteers) with 57 randomized to treatment and 56 randomized to attention-matched control. Of those randomized, 20 (35%) dropped out of the treatment group for medical reasons or inability to get to the classes and 22 (39%) dropped out of the control for the same reasons. Thirty-seven participants completed the treatment intervention, and 34 completed the control intervention.

Intervention

The task-oriented treadmill treatment intervention focused on an ultimate goal of engaging the participant in three 40-minute exercise sessions weekly at an aerobic intensity of 60% heart rate reserve. Starting at the individuals' baseline exercise capacity, the duration and intensity of treadmill training was increased every two weeks as tolerated to achieve target goal. Under the supervision of a physical therapist, the stretching control group performed 13 supervised stretching movements of major muscle groups on a raised mat table. These activities are the same as those done during traditional physical therapy sessions. Both groups experienced the same duration and number of sessions and spent the same amount of time in the exercise gym over the six-month trial (Luft, et al., 2008; Macko, et al., 2005)

Outcome Measures

Descriptive measures were obtained from participants and included age, gender, race, education, and marital status. The remaining outcome measures were completed by participants via structured interview and included:

Short Self-efficacy and Outcomes Expectations for Exercise (SEE/OEE)—The Short Self-efficacy (5-items) and outcome expectations (4-items) for exercise scales assess participants' attitudes and beliefs regarding exercise. The self-efficacy measure addresses the most common challenges that older adults with stroke identify with regard to engaging in exercise. The Short Self-Efficacy for Exercise Scale asks 4 questions regarding the respondent's confidence in their ability to perform exercise given a particular barrier circumstance, and responses range from 1 = Not Confident to 5 = Very Confident. The Short Outcome Expectations for Exercise Scale asks the respondent's level of agreement with 6 statements regarding positive outcomes associated with exercise. Responses range from 1 – Strongly Disagree to 5 = Strongly Agree. The SEE/OEE have demonstrated internal consistency, reliability and validity (Shaughnessy, Resnick, & Macko, 2004). The measures have consistently been associated with exercise behaviors among stroke survivors.

Yale Physical Activity Survey (YPAS)—The YPAS is a self-report of five categories of physical activity (PA), including housework, yard work, caretaking, moderate PA (i.e. exercise including such things as brisk walking, biking, dance, etc), and recreational

activities performed during a typical week. The YPAS includes a wide range of lower intensity activities that older adults often engage in. Participation in each activity (hrs/week) is multiplied by an intensity code (kcal/min) and then summed over all activities in order to calculate a weekly energy expenditure summary index. The YPAS shows evidence of two week repeatability ($r=0.63$, $p<.001$), and has been validated against several physiological variables that are indicative of habitual activity (DiPietro, Caspersen, Ostfeld, & ER, 1993; Pescatello, DiPietro, Fargo, Ostfeld, & Nadel, 1994) and other PA surveys (Moore, et al., 2008).

Stroke Impact Scale (SIS)—The Stroke Impact Scale v.3.0 is a valid, reliable, self-report measure that includes 59 items and assesses 8 domains (strength, hand function, ADL/IADL, mobility, communication, emotion, memory and thinking, and participation). This measure has been used repeatedly with stroke survivors and has demonstrated evidence of reliability and validity as well as sensitivity to change over time (Duncan et al., 1999).

The final item of the SIS asks participants to indicate, based on a visual analog scale going from 0% (no recovery) to 100% (full recovery) how much they felt they had recovered from their stroke.

Data Analysis

Mean, median, range and standard deviations were calculated for all outcome and descriptive variables. Between-group changes from baseline to 6-month follow in the two groups were compared using a 2 (time) by 2 (treatment) repeated measure analysis of variance for all study outcomes. A two-tailed $p<0.05$ was considered significant. The assumption of Sphericity was tested using Mauchly's sphericity test and was met for all variables and Box's M statistic was used to test and assure the homogeneity of the inter-correlations.

Results

Of the 71 total participants engaged in the study, 64 participants (90%), completed all baseline and 6 month surveys. The mean age of the participants was 64.3 (SD=9.2) years and slightly more than half (56%) were women, 22(34%) were married, 1 (1%) co-habited, 28 (44%) were unmarried (divorced, separated, never married, or widowed), and the remaining 14 (22%) had missing demographic data. A little over half of the participants were African American (53%; $N=34$), with 42% ($N=27$) being Caucasian, 1 (2%) Hispanic and the remaining 2 participants (3%) had missing data. A total of 29 (45%) participants continued their education post high school, 11 (17%) completed high school, 7 (11%) had some high school, 3(5%) completed grade school, and 14 (22%) lacked educational data.

As shown in Table 1, at baseline overall the participants had high outcome expectations for exercise and believed in the benefits of engaging in exercise with a mean of 4.03 (SD=.69, range 0-5) with higher scores indicative of stronger outcome expectations. Self-efficacy for exercise expectations were not as strong with a mean of 3.54 (SD=1.07 and range 0-5). This suggests that participants were not strongly confident in their ability to exercise in the face of challenges to exercise (e.g, pain). Participants reported that they engaged in 2125 (SD=1908) minutes of housework weekly, the equivalent of about 5 hours of housework daily. They reported 185 (SD=420) minutes of recreational activity weekly or about 26 minutes of recreational activity daily, and 873 (SD=1465) minutes of exercise (moderate intensity physical activity) weekly or approximately 2 hours of exercise daily. On a scale of 0 to 100% they perceived their recovery post-stroke to be around 20%. The Stroke Impact Scale results suggested that participants perceived a moderate physical impact from the

stroke, but minimal impact with regard to memory, mood and communication, ability to engage in daily activities, mobility, hand function and social activities.

Following 6 months of three times per week treadmill training or control stretching, all study participants reported a statistically significant improvement in outcome expectations over time ($F=13.23$, $p<0.001$, power 95%) and a non significant improvement in self-efficacy expectations over time ($F=2.95$, $p=0.09$, power 39%). There was no statistically significant treatment-by-time interaction in outcome expectations ($F=.04$, $p=.84$, power 5%) or self-efficacy expectations ($F=.27$, $p=.61$, power 8%). Likewise, there was no significant treatment effect on physical activity based on the Yale Physical Activity Survey. All participants, however, reported a decline in the amount of time they engaged in housework ($F=4.00$, $p=.05$, power 50%).

On the Stroke Impact Scale, participants in both treatment and control groups reported improvement in their ability to engage in daily activities such as shopping, doing personal care, and housework over the course of the 6 month intervention period ($F=10.97$, $p=.002$, power 90%). There was no time or treatment effect on any of the other subscales in the Stroke Impact Scale or on the participant's perceptions of overall stroke recovery.

Discussion

Our original hypotheses were not supported by the results of this study, as we found no differential impact by treatment group on any of the psychosocial outcomes. There was, however, improvement in outcome expectations of all study participants and a trend toward improvement in self-efficacy. It is possible that the lack of treatment effect noted in this study is due to the fact that study participants in both groups were exposed to the mechanisms identified by Bandura that are most likely to influence efficacy expectations. Specifically, we know that both groups were exposed to enactive mastery, or actual performance of exercise activities under supervision, and all were exposed to seeing other similar stroke survivors exercising in the gym. We did not control the dosing of verbal encouragement given by other participants or the exercise interventionists, or explore the sensations and feelings associated with exercise that the participants may have experienced (e.g., fear of falling, pain). This similarity in exposure may have precluded a treatment effect.

The improvement overall in study participants' outcome expectations associated with exercise is important from a clinical perspective. By engaging stroke survivors in exercise activities, regardless of the type of activity, their beliefs in the benefits associated with exercise can be strengthened. This may have important long term implications with regard to their willingness to engage in and adhere to regular exercise activities over time.

Our inability to improve time spent in all types of physical activity in this study may be due to challenges associated with the measurement of physical activity. As has been noted in prior research there is a tendency to over interpret abilities, particularly when individuals have little experience performing these activities (Branch & Meyers, 1987; Dishman, Darracott, & Lambert, 1992; Paffenbarger, Blair, Lee, & Hyde, 1993; Pols, Peeters, Kemper, & Collette, 1996; Resnick, Ory, Coday, & Riebe, 2005). In this sample, there was not a strong significant relationship between survey reports of physical activity and objective information including $VO_{2\text{ max}}$ or number of steps taken based on a Step Activity Monitor (Luft et al., 2008). Given the known increased energy level needed for hemiparetic patients to ambulate, we anticipate that study participants overinterpreted their activity as being at a higher intensity level than may have actually been the case. Ongoing research is needed to help individuals post stroke more accurately interpret and measure their level of activity.

In addition to over reporting the level of physical activity performed, we found that participants generally reported high self-efficacy for exercise. It is not unusual for individuals to report high self-efficacy, particularly when they do not have a lot of experience with the activity of interest, such as exercise (Resnick, Orwig, et al., 2005; Jones, et al, 2005; Vancouver, et al., 2001; Vancouver, et al., 2002; McAuley, et al., 2006). When measuring baseline self-efficacy, future research with stroke patients should consider measuring self-efficacy directly after the individual has performed a timed period of brisk walking. More accurate measurement of self-efficacy is important to better reflect the impact of exercise interventions on these beliefs and to optimally motivate these individuals to engage in regular exercise activities.

It is often anticipated that, by increasing participation in exercise, older adults will be able to engage in their routine physical activities, and thus should increase the amount of time spent in those activities. Our findings, as verbally reported in the YPAS, did not support this. Rather, we found a decrease in time in which they performed all activity. The decrease in activity over time was statistically significant with regard to housework. It is possible that participants in both groups simply had less time to engage in household and other activities because of travel to and from the gym and exercise activities three times per week during the course of the study. Alternatively, it is also possible that they deliberately limited their household activities as they felt that study-related treadmill or stretching exercises represented sufficient physical activity. Another possibility is that they developed an increase in endurance and thus could perform routine activities such as household tasks more efficiently. Future work needs to explore this finding and potential reasons for these changes so that interventions can be altered accordingly. This may have important implications in terms of future interventions. Stroke patients may need help to moderate activity versus rest, or they may need to be reminded of overall physical activity goals and guidance in translating exercise-related gains into free-living physical activity in home and community settings. Although the overall time spent in activity did not change, the study participants in both groups noted a significant improvement in their ability to perform daily activities including personal care, shopping and household activities. From a physiological perspective, as has been previously reported (Luft, et al., 2008; Macko, et al., 2005), there was evidence that treadmill training increased fitness, endurance and physical performance, providing support for this perception. Specifically, those in the treatment group had a 51% increase in peak effort treadmill walking velocity which was significantly greater than the 11% increase in the stretching group. In addition, the average walking velocity during a 6-minute over ground walk increased by 19% in the treadmill group versus 8% in the stretching group. This may explain their perceptions of improved ability to perform routine activities and the decreased time needed to perform household tasks. Unlike the focus on physiological outcomes (Luft, et al., 2008) we did not demonstrate any treatment-related differences in the psychosocial measures. It is possible that getting to the exercise classes three times per week, which involved walking from the parking lot into the gym a distance of approximately two blocks, and engaging in either the stretching or treadmill activity was sufficient to induce improvement in the performance of the routine activities done in the course of a day.

The participants in this study were able to ambulate at least short distances and reported more time spent in physical activity than other groups of community dwelling older adults (Gerdham P, 2008; Janney CA, 2008). Despite this subjective report, they indicated that they felt they experienced only a 20% recovery from their stroke. Participant identification of recovery goals was not delineated as part of this study, and thus we do not know what these stroke survivors considered as important aspects of their full recovery. Focus groups with these stroke survivors suggest that such things as being able to drive and work may be equally, if not more, important to their overall recovery process (Resnick B, 2008). In fact,

when asked why they continued participation in the study, subjects identified numerous benefits that condensed around 8 themes: achievement of personal goals, psychological benefits, physical benefits (“feeling better, stronger”), security of exercising with supervision, encouragement from staff, social support from each other, improvements in instrumental activities of daily living, and an intrinsic pull of self-determination (Resnick B, 2008). From a motivational perspective, it may be useful to identify goals with participants at the beginning and focus exercise interventions directly on achievement of those goals. This may be particularly relevant when focusing on long term adherence to exercise and activity behaviors.

Limitations

This study was limited by the fact that it included a small group of volunteers who were selected based on their ability to engage in the exercise activities and their willingness to adhere to the program. Consequently, this sample had relatively high self-efficacy and outcome expectations and engaged in more physical activity than might be noted in other groups of community dwelling older adults, particularly individuals post stroke. There are challenges to many of the self-report measures in terms of preventing inflation of scores. In addition, it is possible that participants responded in a socially desirable manner.

Despite these limitations, our results provide useful guidance for future research considering self-efficacy and other psychosocial outcomes post stroke. We suggest careful attention to some of the measurement challenges identified in this study with regard to reporting of efficacy expectations and physical activity. It may be particularly helpful, especially when gathering baseline efficacy data to ask the participant to respond to self-efficacy and outcome expectation questions after they performed the given activity. In addition, we believe that it may be helpful to explore with stroke patients their physical activity goals and encourage them to work towards those currently recommended to help decrease stroke risk. In so doing we may be able to establish optimal exercise interventions for adults post stroke that are sustainable over time and thereby decrease their risk of recurrent strokes and improve quality of life.

Implications

Nurses who care for stroke survivors should be aware of the established benefits of exercise and current exercise recommendations for these patients. Nurses can take initiative to make sure that stroke survivors have an exercise program on discharge from acute, sub-acute and rehabilitation settings, and appropriate home therapy referrals as needed. Nurses in any setting with these patients can be instrumental in bolstering of efficacy expectations, both self-efficacy and outcome expectations, as these are valuable nursing interventions. Providing education and encouragement, and addressing unpleasant sensations, such as pain, depression or anxiety can boost confidence and determination for stroke survivors and their families to initiate and maintain an exercise regimen that will enhance recovery and aid in controlling risk for a future vascular event.

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Table 1

Repeated Measure Results for All Outcome Variables

Variable	N	Baseline	6 month	Treatment by Time Interaction		Effect of Time	
				F (p)	Partial Eta Squared (power)	F (p)	Partial Eta Squared (power)
Outcome Expectations (range 0-5)							
Control	34	3.89 (.68)	4.22(.62)	.04 (.84)	.01(5%)	13.23(.001)	.18(95%)
Treatment	29	4.19(.68)	4.48 (.51)				
Total	64	4.03 (.69)	4.34(.58)				
Self-efficacy (range 0-5)							
Control	34	3.50(1.16)	3.65(.96)	.27(.61)	.26(8%)	2.95(.09)	.05(39%)
Treatment	29	3.57(.97)	3.85(.86)				
Total	63	3.54(1.07)	3.75(.91)				
Housework (min/wk)							
Control	33	2,159(280)	1,693(1584)	.03(.86)	.01(5%)	4.00(.05)	.07(50%)
Treatment	28	2,083(1714)	1,695(1908)				
Total		2,125(1908)	1,694(1722)				
Recreational Activity (min/wk)							
Control	33	142(262)	200 (345)	.83(.36)	.02(15%)	.01(.93)	.01(5%)
Treatment	28	240(557)	190(388)				
Total	61	186(420)	196(362)				
Exercise							
Control	33	850(1521.)	776(1039)	.064(.80)	.01(5%)	.02(.89)	.02(6%)
Treatment	27	902(1422)	880(876)				
Total	60	873(1465)	823(962)				
Total Activity							
Control	33	3151(2840)	2669(1990)	.01(.97)	.01(5%)	2.48(.12)	.04(34%)
Treatment	27	3225.6(2826)	2765.5(2409)				
Total		3185(2810)	2713(2169)				
Visual Analogue Scale (0=no recovery to 100 =full recovery)							
Control	32	23.47(26.11)	22.91(28.47)	.03(.85)	.01(5%)	.09(.77)	.02(17%)

Variable	N	Baseline	6 month	Treatment by Time Interaction		Effect of Time	
				F (p)	Partial Eta Squared (power)	F(p)	Partial Eta Squared (power)
Treatment	20	13.75(27.17)	21.45(26.92)				
Total	52	23.58(26.26)	22.35(27.62)				
Stroke Impact Scale (physical impact)				.72(.40)	.01(13%)	1.1(.31)	.02(17%)
Control	34	48.36(18.17)	48.74(18.15)				
Treatment	29	43.98(22.37)	47.87(20.33)				
Total	63	46.35(20.17)	46.35(20.16)				
Stroke Impact Scale (memory)				.10(.76)	.01(6%)	.39(.53)	.01(9%)
Control	33	82.89(16.75)	84.53(13.35)				
Treatment	31	91.37(11.05)	91.91(8.4)				
Total	64	86.99(14.80)	88.11(11.77)				
Stroke Impact Scale (mood and emotion)				.97(.34)	.33(16%)	.15(.70)	.01(7%)
Control	34	84.07(12.25)	81.92(16.68)				
Treatment	26	85.58(12.24)	86.51(10.32)				
Total	60	84.72(12.16)	83.91(14.35)				
Stroke Impact Scale (communication)				.69(.42)	.01(13%)	.09(.77)	.01(6%)
Control	34	87.92(12.91)	89.58(12.09)				
Treatment	26	91.34(16.35)	90.56(13.95)				
Total	60	89.40(14.47)	90.01(12.83)				
Stroke Impact Scale (daily activities)				.21(.65)	.01(7%)	10.97(.002)	.15(90%)
Control	34	72.94(16.54)	78.68(15.36)				
Treatment	29	73.96(15.46)	78.30(11.57)				
Total	61	73.41(15.93)	78.50(13.64)				
Stroke Impact Scale (mobility)				.01(.92)	.01(5%)	.89(.35)	.02(15%)
Control	32	82.54(12.71)	84.28(12.56)				
Treatment	28	82.62(17.47)	84.02(14.25)				
Total	60	82.58(14.99)	84.16(13.21)				
Stroke Impact Scale (hand function)				.31(.58)	.01(8%)	1.41(.24)	.04(21%)
Control	18	53.61(29.19)	55.56(29.25)				

Variable	N	Baseline	6 month	Treatment by Time Interaction		Effect of Time	
				F (p)	Partial Eta Squared (power)	F(p)	Partial Eta Squared (power)
Treatment	15	62.67(19.14)	68.00(32.05)				
Total	33	57.73(29.07)	61.21(30.92)				
Stroke Impact Scale (social activities)				2.37(.13)	.04(33%)	.03(.86)	.01(5%)
Control	34	75.93(19.15)	79.50(15.96)				
Treatment	29	82.51(16.71)	79.65(16.98)				
Total	63	78.96(18.22)	79.57(16.30)				
Stroke Impact Scale (overall sum)				.97(.33)	.02(16%)	.39(.53)	.01(10%)
Control	34	563.84(89.95)	577.06(83.99)				
Treatment	29	579.95(80.79)	577.06(102.43)				
Total	63	571.25(85.55)	577.06(92.16)				